Apalachicola River and Bay Watershed Explorations

Apalachicola National Estuarine Research Reserve

The Great Water Journey Third Grade

Apalachicola National Estuarine Research Reserve
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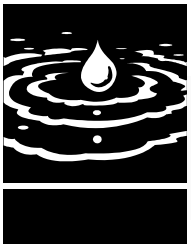


THE GREAT WATER JOURNEY

CONCEPT

Students play a board game where they travel through different parts of the water cycle in the Apalachicola River watershed.

OBJECTIVES

1) Students will be able to identify the parts of the water cycle.
2) Students will be able to explain how a drop of water moves through the water cycle.
3) Students will be able to identify 3 water bodies in the Apalachicola River watershed.
4) Students will be able to identify 2 uplands areas in the Apalachicola River watershed.
5) Students will be able to describe how water bodies are formed.

METHOD

Students learn through involvement in a hands-on board game that follows the journey of a drop of water through the water cycle in the Apalachicola River watershed.

Grade level: 3rd Grade
Subjects: Science, Social Studies
Location: This activity can be done in the classroom
Materials: Module components, TV, VCR
Duration: 1 or 2 class periods
Sunshine State Standards: Listed on p. 6 of the activity

PREPARATION ACTIVITIES:

- *Imagine!* From Project WET
- Water Cycle Video

GETTING READY:

1. Ask students to read the background reading section. Carefully review the vocabulary with the students. Students need to understand the vocabulary in order to complete the board game. Review the concepts of liquid and gas forms of water. What other form can water take in nature? (Hint: we don't see much of it in Florida!)

ACTIVITY:

Students participate in a water journey game where they travel through different parts of the water cycle in the Apalachicola River watershed.

1. Divide students into groups of four or five players per board.
2. Read the activity scenario to the class.

3. Give each of the groups a game board and a set of cards that will be placed at various "stops" along students' travels through the water cycle. Give each student a playing piece and data sheet to record their progress.
4. Follow the activity directions and enjoy the journey!

WRAP UP:

Have each student compare data sheets with the other students in their group. Ask each child to explain to the group the path that their water drop traveled. Were the journeys different from or similar to each other? Where did the water drops spend the majority of their time?

ASSESSMENT:

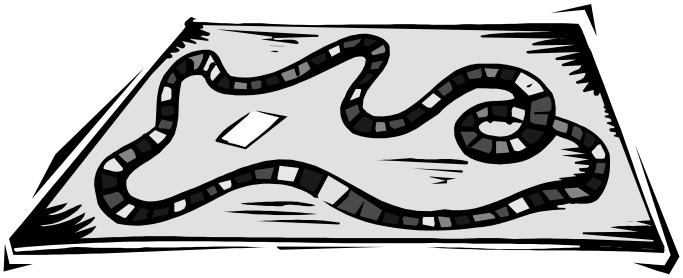
Give each student a copy of the Apalachicola River watershed map. Ask them to draw their water drop's journey, labeling the bodies of water and upland areas they visited. Ask them to write a summary of their journey at the bottom of the map. Have students write a story about their water drop's journey. Provide a copy of pages 2 and 3 of the Southwest Florida Water Management District's *WaterDrops* (Volume 1 Issue 2) as a story prompt.

POST ACTIVITIES:

- Aqua Words from Aquatic WILD. Focus the activity on the water cycle.

RESOURCES:

- *WaterDrops: A Water Resource Newsletter*, Volume 1, Issue 2, Southwest Florida Water Management District. Download at http://www.swfwmd.state.fl.us/infoed/waterdrops/wd_2.pdf
- *Florida Waters*, by E.D. Purdum, Institute of Science and Public Affairs, Florida State University, completed for Florida's Water Management Districts. Download at http://sjr.state.fl.us/programs/outreach/pubs/index.html
- Florida's Water Management Districts:
  - http://www.state.fl.us/nwfwmd
  - http://www.srwmd.state.fl.us/
  - http://sjr.state.fl.us/
  - http://www.swfwmd.state.fl.us
  - http://www.sfwmd.gov/



ACTIVITY SCENARIO:

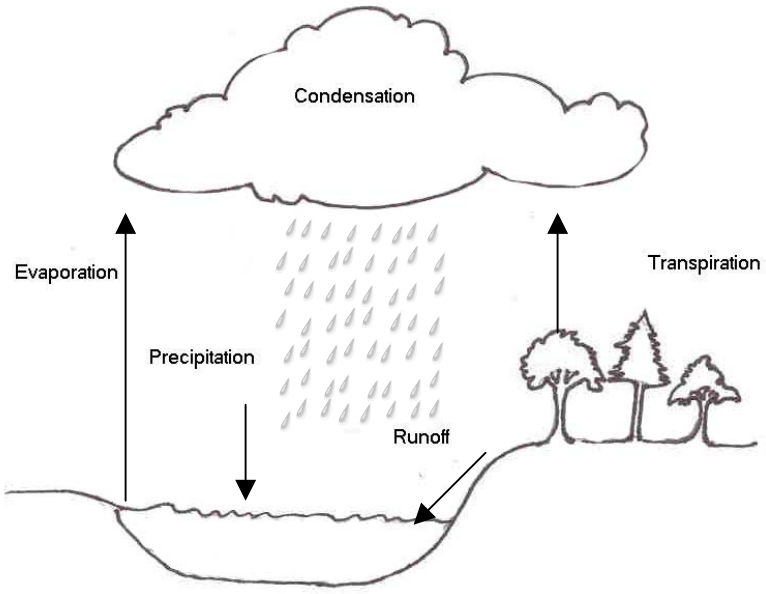
Each of you is a drop of water in a storm cloud. There is about to be a great rainstorm across the Panhandle of Florida and you all are about to be dropped somewhere in the Apalachicola River watershed. Your journey does not end here – water takes on a lot of forms and may travel many places, or you may go to the same places many times. We'll play the game to find out where you go on your journey.

Activity Directions:

1. Each group should have the following:

- One game board
- One playing piece for each student
- One set of playing cards

1. All players begin at the cloud. Each student should choose a playing piece. Decide who goes first by putting all playing pieces in a paper bag and then draw out a piece. The player whose piece is drawn goes first. After the starting player is determined, take turns in clockwise order.
2. When it is your turn, pick up a card from where your piece is located and read the scenario out loud to the group. Move your piece to the next destination and record what happened on your data sheet. Once you have read the card, put it at the bottom of the pile it came from. This ends your turn.
3. Continue playing until your data sheet is full. Once everyone's sheet is full the game is over.
5. Once done, each player should look over their data sheet to make sure they filled it out completely.



The Water Cycle

Background Reading for The Great Apalachicola Water Journey

Water never stops moving. Rain falls to the earth from clouds. The rainwater runs downhill into rivers and lakes. Eventually the water flows into the ocean.

During evaporation, the water turns from liquid into gas, and moves from oceans and lakes up into the atmosphere where it forms clouds. Then the cycle begins all over again.

The **water cycle**, also known as the **hydrologic cycle**, is the journey water takes as it circulates from the land to the sky and back again. The water cycle is the endless process by which the water in our **system**, the Earth, is recycled through the environment.

The Sun's heat leads to **evaporation** of water from oceans and lakes on the Earth's surface. Plants also lose water to the air in a process called **transpiration**. The water vapor eventually gathers together through **condensation**, forming tiny droplets in clouds. When the clouds meet cool air over land or water, **precipitation** (rain, sleet, or snow) is triggered, and water returns to the land or sea.

Some of the precipitation soaks into the ground in a process called **percolation**. Some of the underground water is trapped between rock or clay layers, in groundwater storage areas called **aquifers**. But most of the water flows downhill as **runoff**, flowing from the land into our swamps, rivers, lakes, and oceans.

Living organisms also help to move water through the water cycle. Humans and animals move water by consuming it and excreting from their bodies through waste, perspiration, and respiration. Plants move water in great quantities by absorbing it from the soil and moving it from their roots to their leaves where it is exposed to the sun and **transpiration** takes place.

Almost three-quarters of the Earth is covered in water. Most of the Earth's water (97.5%) is in major water bodies, such as oceans, bays, rivers, swamps, and polar ice caps. A small amount of water (2.4%) is stored as groundwater in **aquifers**. For example, in Florida, our drinking water comes from the **Floridan Aquifer**. The Earth's **atmosphere** contains a tiny bit of water (less than 0.001%).

Vocabulary

Water Cycle (Hydrologic Cycle): An endless process where the water in our system, the Earth, is recycled through the environment and through living organisms.

System: A set or arrangement of things that are related or connected so as to form a unity or organic whole, like a solar system.

Evaporation: The conversion of water from a liquid to a gas. Gas vapors are formed when the sun heats water on the surface of the land or in lakes, rivers, swamps, or oceans.

Transpiration: The movement of moisture from plants to the atmosphere. Gas vapors are created when plants and trees give off moisture from their leaves.

Condensation: The conversion of water from a gas into a liquid. Tiny water droplets are formed when water vapor rises into air and cools. These tiny droplets gather together to form larger drops in clouds or fog.

Precipitation: The movement of water from the atmosphere back to earth. Moisture is released from the clouds in the form of rain, sleet, snow, or hail.

Percolation: The downward movement of water through the ground, where water gradually flows between soil and rock particles into underground water storage areas.

Runoff: The movement of excess water from the land into swamps, rivers, bays, or oceans. This water stays in the form of liquid on the surface, so it does not evaporate, percolate, or transpire through plants. Runoff may cause flooding. Runoff from urban and agricultural areas often includes fuels, chemicals, cleansers, fertilizers, and other human-made pollutants.

Aquifer: An underground water storage area within layers of porous rock or sand. Aquifers are often used as sources of human drinking water. In the Apalachicola area, we get our drinking water from the **Floridan Aquifer**.

Atmosphere: The air surrounding the Earth. The Earth's atmosphere contains oxygen, nitrogen, and other gases and extends 22,000 miles above the earth. The atmosphere also contains a little bit of water vapor at any given time.

Sunshine State Standards Activity Correlations

Science

Processes that Shape the Earth

Standard 1: The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.(SC.D.1.2)

SC.D.1.2.2 knows that 75 percent of the surface of the Earth is covered by water.

SC.D.1.2.3 knows that the water cycle is influenced by temperature, pressure, and the topography of the land.

SC.D.1.2.4 knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features.

How Living Things Interact with Their Environment

Standard 1: The student understands the competitive, interdependent, cyclic nature of living things in the environment. (SC.G.1.2)

SC.G.1.2.3 knows that green plants use carbon dioxide, water, and sunlight energy to turn minerals and nutrients into food for growth, maintenance, and reproduction.

The Nature of Science

Standard 1: The student uses the scientific processes and habits of mind to solve problems (SC.H.1.2)

SC.H.1.2.1 knows that it is important to keep accurate records and descriptions to provide information and clues on causes of discrepancies in repeated experiments.

SC.H.1.2.2 knows that a successful method to explore the natural world is to observe and record, and then analyze and communicate the results.

SC.H.1.2.3 knows that to work collaboratively, all team members should be free to reach, explain, and justify their own individual conclusions.

SC.H.1.2.4 knows that to compare and contrast observations and results is an essential skill in science.

SC.H.1.2.5 knows that a model of something is different from the real thing, but can be used to learn something about the real thing.

Standard 2: The student understands that most natural events occur in comprehensible, consistent patterns. (SC.H.2.2)

SC.H.2.2.1 knows that natural events are often predictable and logical.

Social Studies

People, Places, and Environments [Geography]

Standard 1: The student understands the world in spatial terms. (SS.B.1.2)

SS.B.1.2.1 uses maps, globes, charts, graphs, and other geographic tools including map keys and symbols to gather and interpret data and to draw conclusions about physical patterns.

Language Arts

Reading

Standard 2: The student constructs meaning from a wide range of texts.LA.A.2.2)

LA.A.2.2.1 reads text and determines the main idea or essential message, identifies relevant supporting details and facts, and arranges event in chronological order.

LA.A.2.2.5 reads and organizes information for a variety of purposes, including making a report, conducting interviews, taking a test, and performing an authentic task

Writing

Standard 1: The student uses writing processes effectively. (LA.B.1.2.)

LA.B.1.2.1 prepares for writing by recording thoughts, focusing on central idea, grouping related ideas, and identifying the purpose for writing.

LA.B.1.2.2 Drafts and revises writing in cursive that: focuses on the topic; has logical organizational pattern, including a beginning, middle, conclusion, and transitional devices; has ample development of supporting ideas; demonstrates a sense of supporting ideas; demonstrates a sense of completeness or wholeness; demonstrates a command of language including precision in word choice; generally has correct subject/verb agreement; generally has correct verb and noun forms; with few exception, has sentences that are complete, expect when fragments are used purposefully; uses a variety of sentence structures; and generally follows the conventions of punctuation, capitalization, and spelling.

Math

Number Sense, Concepts, and Operations

The student understands the different ways number are represented and used in the real world. (MA.A.1.2)

MA.A.1.2.1 names whole numbers combining three-digit numeration (hundreds, tens,ones) and the use of number periods, such as ones, thousands, and millions and associates verbal names, written word names, and standard numerals with whole numbers, commonly used fractions, decimals, and percents.

MA.A.1.2.2 understands the relative size of whole numbers, commonly used fractions, decimals, and percents.

MA.A.1.2.3 understands concrete and symbolic representations of whole numbers, fractions, decimals, and percents in real-world situations.

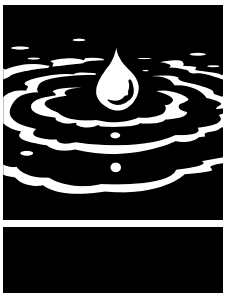
MA.A.1.2.4 understands that numbers can be represented in a variety of equivalent forms using whole numbers, decimals, fractions, and percents.

Data Analysis and Probability

Standard 1: The student understands and uses the tools of data analysis for managing information. (MA.E.1.2)

MA.E.1.2.1 solves problems by generating, collecting, organizing, displaying, and analyzing data using histograms, bar graphs, circle graphs, line graphs, pictographs, and charts.

Data Sheet: The Great Water Journey



Where did your water drop go? Record your journey on the sheet below. Make sure you include where you went and how you got there. Hint: Use the vocabulary words to describe how you got there.

Stops	Where did you go?	How did you get there?
1	*Inside a cloud*	*My drop is inside a storm cloud formed by **condensation**, and is about to be dropped in the Apalachicola River watershed.*
2		
3		
4		
5		
6		
7		
8		
9		
10		

Playing-Card Scenarios

From the Cloud:
You fall from the sky as rain and land on the leaf of a tupelo tree in the hardwood swamp. Move your playing piece to the hardwood swamp.

You fall from the sky as rain and drop into the Apalachicola Bay. Move your playing piece to the Apalachicola Bay. (2)

You fall from the sky as rain and land on the umbrella of a tourist visiting downtown Apalachicola. Move your playing piece to downtown Apalachicola.

You fall from the sky as rain and land in the salt marsh near where a raccoon is hunting for fiddler crabs. Move your playing piece to the salt marsh.

You fall from the sky as rain and land in the Apalachicola River as it swells from all of the rainfall. Move your playing piece to the Apalachicola River.

You fall from the sky onto the ground of the pine flatwoods. Go to pine flatwoods.

From the Hardwood Swamp:
You drip onto the ground where the sun warms you and you evaporate into the air and form part of a cloud. Move your playing piece to the cloud.

You are taken in by a fish that is then eaten by a little blue heron that then flies to a tree by the river to roost for the night where you are then excreted as waste. Move your playing piece to the Apalachicola River.

You are flushed out of the swamp with the other rain as runoff. You flow into the Apalachicola River. Move your playing piece to the Apalachicola River.

You soak into the ground where you are taken up in the roots of a cypress tree. You are then released from the leaf by transpiration into the air and you join a cloud. Move your playing piece to the cloud.

From the Apalachicola Bay:
You are taken in by a sturgeon that swims up into the Apalachicola River. Move your playing piece to the Apalachicola River (2).

You evaporate off of the water and go to make a cloud. Move your playing piece to the cloud. (3)

You are taken in by an oyster that is caught by an oyster farmer who sells you in downtown Apalachicola. Move your playing piece to downtown Apalachicola.

You are taken up in the roots of a seagrass plant and then eaten by a mullet fish. The mullet is caught by a bald eagle which flies to the pine flatwoods to feed the fish to her baby eaglets. Go to pine flatwoods.

From the Apalachicola River:
With the heavy rains, the river floods and you are carried over the river bank and back into the hardwood swamp. Move your playing piece to the hardwood swamp.

You are washed into the Apalachicola Bay. Move your playing piece to the Apalachicola Bay. (3)

You are on the back of a Florida Cooter turtle that climbs onto a log to sun itself. You evaporate into the air and join a cloud. Move your playing piece to the cloud.

From the Pine Flatwoods:
You are taken in by a spotted skunk and excreted onto the ground. Keep your playing piece in the pine flatwoods.

You soak into the ground and the roots of a slash pine take you up. You are then released through transpiration from the leaf into the air and join a cloud. Move your playing piece to the cloud.

You gradually flow over the ground surface and into the Apalachicola River. Move your playing piece to the Apalachicola River (2).

From downtown Apalachicola:
You evaporate from your location and join a cloud. Move your playing piece to the cloud. (2)

You are washed from your location and flow down the street as runoff that flows through a storm drain into Apalachicola Bay. Move your playing piece to the Apalachicola Bay. (2)

From the Salt Marsh

As the tide rolls out the sun warms the remaining water and you evaporate and rise up into the atmosphere to form a cloud. Move your playing piece to the cloud.

You permeate into the muddy bottom and are sucked into the roots of the cord grass where transpiration occurs. You rise back into the atmosphere to form a cloud. Move your playing piece to the cloud.

A crown conch absorbs you into its body to prevent itself from drying out. The conch is eaten by a great blue heron, which flies off towards the river and you

are excreted as waste by the bird into the river. Move your piece to the Apalachicola River.

You are swallowed by striped mullet and move out into the bay, where the mullet is caught by fisherman and sold in downtown Apalachicola. Move your piece to downtown Apalachicola.